

## MIRAI MR07-01 Bottle Sampling Water Chemical Analysis

Last Modified: 2017-07-28

ReadMe Observation Data Data Format Quality Information

Cruise ID: **MR07-01**

Bottle Sampling Water Chemical Analysis: Processed (PI)

Data Policy: **JAMSTEC**

Observation Items: Temperature, Salinity, Dissolved oxygen, Silicate, Nitrate, Nitrite, Phosphate, Ammonia, Total inorganic carbon, Alkalinity, pH

Science Keywords:

OCEANS > OCEAN CHEMISTRY > AMMONIA  
OCEANS > OCEAN CHEMISTRY > INORGANIC CARBON  
OCEANS > OCEAN CHEMISTRY > NITRITE  
OCEANS > OCEAN CHEMISTRY > NITRATE  
OCEANS > OCEAN CHEMISTRY > NUTRIENTS  
OCEANS > OCEAN CHEMISTRY > OXYGEN  
OCEANS > OCEAN CHEMISTRY > pH  
OCEANS > OCEAN CHEMISTRY > PHOSPHATE  
OCEANS > OCEAN CHEMISTRY > SILICATE  
OCEANS > OCEAN CHEMISTRY > SALINITY  
OCEANS > OCEAN TEMPERATURE > WATER TEMPERATURE  
OCEANS > SALINITY/DENSITY > SALINITY  
OCEANS > OCEAN CHEMISTRY > ALKALINITY  
OCEANS > OCEAN CHEMISTRY > CARBON  
OCEANS > OCEAN TEMPERATURE > POTENTIAL TEMPERATURE

Cruise Report

[http://www.godac.jamstec.go.jp/catalog/data/doc\\_catalog/media/MR07-01\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR07-01_all.pdf)

### For Using Data

#### Principal Investigator

CTDTMP : Masahide Wakita (JAMSTEC)  
CTDSAL : Masahide Wakita (JAMSTEC)  
SALNTY : Masahide Wakita (JAMSTEC)  
OXYGEN : Masahide Wakita (JAMSTEC)  
SILCAT : Masahide Wakita (JAMSTEC)  
NITRAT : Masahide Wakita (JAMSTEC)  
NITRIT : Masahide Wakita (JAMSTEC)  
PHSPHT : Masahide Wakita (JAMSTEC)  
NH4 : Masahide Wakita (JAMSTEC)  
TCARBON : Masahide Wakita (JAMSTEC)  
ALKALI : Masahide Wakita (JAMSTEC)  
PH : Masahide Wakita (JAMSTEC)

#### Use Constraints

See [Terms and Conditions](#) about constrain of use.

#### Data Citation

See [Terms and Conditions](#) about data citation.

### Instrument

Instrument:

Salinity measurement system



Instrument:

Nutrient analyzer(4ch) ( - MR09-01)



Instrument:

Total dissolved inorganic carbon measurement system ( - MR11-E02)



Instrument:

pH meter (MR02-K03 -)



### Information on CTD data

#### (1) Temperature sensor

Model : SBE3, Sea-Bird Electronics, Inc.  
Measurement range : -5.0 to +35degC  
Accuracy : 0.001degC  
Resolution : 0.0002degC

#### (2) Salinity sensor

Model : SBE4, Sea-Bird Electronics, Inc.

Measurement range : 0.0 to 7S/m  
Accuracy : 0.0003S/m  
Resolution : 0.00004S/m  
(3) Pressure sensor  
Model : SBE9plus, Sea-Bird Electronics, Inc.  
Measurement range : up to 10500m  
Accuracy : 0.015%F.S.  
Resolution : 0.001%F.S.

**Information on Chemical and Biological data**

**1. Dissolved Oxygen**

- (1) Instruments : Burette: APB-510 manufactured by Kyoto Electronic Co. Ltd. / 10 cm<sup>3</sup> of titration vessel  
Detector and Software: Automatic photometric titrator manufactured by Kimoto Electronic Co. Ltd  
(2) Methods : Winkler method/photometric methods  
(3) Precision : 0.09  $\mu$ mol kg<sup>-1</sup>  
(4) Reference Material/Calibration : 0.001667M KIO<sub>3</sub> solution

**2. Salinity**

- (1) Instruments : Autosal salinometer model 8400B (Guildline Instruments Ltd.)  
(2) Methods : -  
(3) Precision : 0.0004 PSU  
(4) Reference Material/Calibration : IAPSO Standard Sea Water batch P146 (Ocean Scientific International Ltd.)

**3. Silicate**

- (1) Instruments : TRAACS800 (Bran+Luebbe)  
(2) Methods : Molybdenum blue method  
(3) Precision : C.V. 0.07% (171  $\mu$ M)  
(4) Reference Material/Calibration : RMNS [Aoyama et al., 2007] and Silicate standard solution, the silicate primary standard, was obtained from Merck, Ltd. This standard solution, traceable to SRM from NIST was 1000 mg per liter.

**4. Nitrate**

- (1) Instruments : TRAACS800 (Bran+Luebbe)  
(2) Methods : Diazotization method (reduced to nitrite by Cd - Cu tube)  
(3) Precision : C.V. 0.08% (55  $\mu$ M)  
(4) Reference Material/Calibration : KNO<sub>3</sub> solution and RMNS [Aoyama et al., 2007]

**5. Nitrite**

- (1) Instruments : TRAACS800 (Bran+Luebbe)  
(2) Methods : Diazotization method  
(3) Precision : C.V. 0.09% (1.2  $\mu$ M)  
(4) Reference Material/Calibration : NaNO<sub>2</sub> solution and RMNS [Aoyama et al., 2007]

**6. Phosphate**

- (1) Instruments : TRAACS800 (Bran+Luebbe)  
(2) Methods : Molybdenum blue method  
(3) Precision : C.V. 0.10% (3.6  $\mu$ M)  
(4) Reference Material/Calibration : KH<sub>2</sub>PO<sub>4</sub> solution and RMNS [Aoyama et al., 2007]

**7. Ammonia**

- (1) Instruments: TRAACS800 (Bran+Luebbe)  
(2) Methods : Indophenol method/gas diffusion method (GDM)  
(3) Precision : C.V. 0.33% (4.0  $\mu$ M)  
(4) Reference Material/Calibration: (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> solution

**8. Total inorganic carbon**

- (1) Instruments : the automated TCO<sub>2</sub> analyzer (Nippon ANS, Inc.) equipped with carbon coulometer (system A: Model 5012, UIC Inc., system C: New type model, Nippon ANS, Inc. and JAMSTEC).  
(2) Methods : coulometry  
(3) Precision : 1.3  $\mu$ mol kg<sup>-1</sup>  
(4) Reference Material/Calibration : -

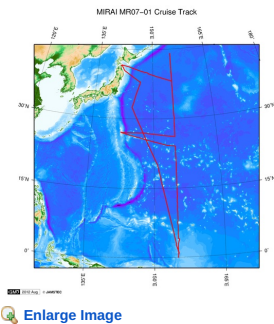
**9. Total Alkalinity**

- (1) Instruments : Measurement of AT was made based on spectrophotometry using a custom-made system (Nippon ANS, Inc.).  
The system comprises of a water dispensing unit, an auto-burette, and a spectrophotometer (Carry 50 Bio, Varian), which are automatically controlled by a PC.  
(2) Methods : Single step acid additional procedure/spectrophotometry  
(3) Precision : 0.6  $\mu$ mol kg<sup>-1</sup>  
(4) Reference Material/Calibration : Na<sub>2</sub>CO<sub>3</sub> solution

**10. pH**

- (1) Instruments : a glass / reference electrode with a pH / Ion meter (Radiometer PHM240)  
(2) Methods : potentiometric methods at 25deg-C  
(3) Precision : 0.001 pH unit  
(4) Reference Material/Calibration : total hydrogen ion scale

**Related Information**



**MR07-01**  
Ship Name: MIRAI  
Period: 2007-02-16 - 2007-03-26  
Chief Scientist: Kazuhiko Matsumoto (JAMSTEC)  
Project Name: [Station KNOT]

#### Update History

2017-07-28	An observation data was registerd.
2015-05-29	An observation data was registerd.
2013-08-29	An observation data was registerd.
2012-10-30	An observation data was registerd.
2012-10-26	An observation data was registerd.

#### JAMSTEC

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#### Lists

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**Data**  
[Map Search](#)  
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#### Information of the Ships

NATSUSHIMA  
KAIYO  
YOKOSUKA  
MIRAI  
KAIREI  
CHIKYU  
KAIMEI  
SHINSEI MARU  
HAKUHO MARU

#### Information of the Submersibles

KAIKO  
SHINKAI 2000  
SHINKAI 6500  
DEEP TOW  
HYPER-DOLPHIN  
URASHIMA  
YOKOSUKA DEEP TOW  
6K Camera DEEP TOW  
6K Sonar DEEP TOW  
KM-ROV  
POWER GRAB SAMPLER (SHELL)  
POWER GRAB SAMPLER (CLOW)  
BMS

#### Go to a Cruise Information

Cruise ID:

#### Go to a Dive Information

Dive ID:



## MIRAI MR07-01 Bottle Sampling Water Chemical Analysis

Last Modified: 2017-07-28

ReadMe Observation Data **Data Format** Quality Information

Cruise ID: [MR07-01](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

Data Policy: [JAMSTEC](#)

### Exchange Format

Provided in the Exchange Format of CCHDO (CLIVAR and Carbon Hydrographic Data Office).

Please see the following link for details of Exchange Format.

[CCHDO | CLIVAR & Carbon Hydrographic Data Office](#)

Format Information

Column No.	Column Heading Mnemonic	Units Mnemonic	Reporting Precision FORTRAN Format	Comments
1	EXPCODE		A14	Expedition code
2	SECT		A6	For WOCE data the WHP section identifier
3	STNNBR		A18	Station number
4	CASTNO		I3	Cast number
5	SAMPNO		A7	Sample number
6	BTLNBR		A7	Bottle identification number
7	BTLNBR_FLAG_W		I1	Bottle quality flag
8	DATE		I8	Cast date(UTC)
9	TIME	UTC	I4	Cast time (UTC)
10	LATITUDE	DEG	F8.3	LATITUDE
11	LONGITUDE	DEG	F9.3	LONGITUDE
12	DEPTH	M	I5	Reported depth to bottom.
13	CTDPRS	DBAR	F9.1	Pressure
14	CTDPRS_FLAG_W		I1	Quality flag for CTD data
15	CTDTMP	ITS-90	F9.4	Temperature
16	CTDTMP_FLAG_W		I1	Quality flag for CTD data
17	CTDSAL	PSS-78	F9.4	CTD Salinity sensor
18	CTDSAL_FLAG_W		I1	Quality flag for CTD data
19	SALNTY	PSS-78	F9.4	Salinity
20	SALNTY_FLAG_W		I1	Quality flags for water samples
21	OXYGEN	UMOL/KG	F9.1	Oxygen
22	OXYGEN_FLAG_W		I1	Quality flags for water samples
23	SILCAT	UMOL/KG	F9.1	Silicate
24	SILCAT_FLAG_W		I1	Quality flags for water samples
25	NITRAT	UMOL/KG	F9.1	Nitrate
26	NITRAT_FLAG_W		I1	Quality flags for water samples
27	NITRIT	UMOL/KG	F9.2	Nitrite
28	NITRIT_FLAG_W		I1	Quality flags for water samples
29	PHSPHT	UMOL/KG	F9.2	Phosphate
30	PHSPHT_FLAG_W		I1	Quality flags for water samples
31	NH4	UMOL/KG	F9.2	Ammonium
32	NH4_FLAG_W		I1	Quality flags for water samples
33	TCARBN	UMOL/KG	F9.1	Total carbon
34	TCARBN_FLAG_W		I1	Quality flags for water samples
35	ALKALI	UMOL/KG	F9.1	Total alkalinity
36	ALKALI_FLAG_W		I1	Quality flags for water samples
37	PH	-	F9.3	pH
38	PH_FLAG_W		I1	Quality flags for water samples

### ODV Format

Please see the following link for details of ODV Format and ODV Software.

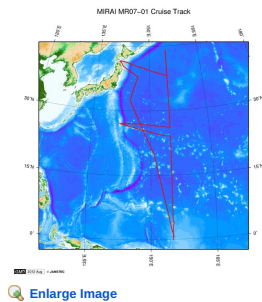
[Ocean Data View \(ODV\)](#)

Format Information

Column No.	Column Heading	Comments
1	Cruise	Cruise Label
2	Station	Station number_Cast number
3	Type	Station type
4	mon/day/yr	Cast date(UTC)
5	hh:mm	Cast time (UTC)
6	Latitude [degrees_north]	LATITUDE
7	Longitude [degrees_east]	LONGITUDE
8	Bot. Depth [m]	Reported depth to bottom.
9	CTDDPT[M]	Depth(Calculate from CTDPRS and LATITUDE)
10	QF	Quality flag for CTD data
11	CTDPRS[DBAR]	Pressure
12	QF	Quality flag for CTD data
13	CTDTMP[ITS-90]	Temperature
14	QF	Quality flag for CTD data
15	CTDSAL[PSS-78]	CTD Salinity sensor
16	QF	Quality flag for CTD data
17	SALNTY[PSS-78]	Salinity
18	QF	Quality flags for water samples
19	OXYGEN[UMOL/KG]	Oxygen
20	QF	Quality flags for water samples
21	SILCAT[UMOL/KG]	Silicate

Column No.	Column Heading	Comments
22	QF	Quality flags for water samples
23	NITRAT[UMOL/KG]	Nitrate
24	QF	Quality flags for water samples
25	NITRIT[UMOL/KG]	Nitrite
26	QF	Quality flags for water samples
27	PHSPHT[UMOL/KG]	Phosphate
28	QF	Quality flags for water samples
29	NH4[UMOL/KG]	Ammonium
30	QF	Quality flags for water samples
31	TCARBN[UMOL/KG]	Total carbon
32	QF	Quality flags for water samples
33	ALKALI[UMOL/KG]	Total alkalinity
34	QF	Quality flags for water samples
35	PH	pH
36	QF	Quality flags for water samples
37	SAMPNO	Sample number
38	QF	Bottle quality flag

#### Related Information



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Chief Scientist: Kazuhiko Matsumoto (JAMSTEC)  
Project Name: [Station KNOT]

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SAMPLER (SHELL)  
POWER GRAB  
SAMPLER (CLOW)  
BMS

#### Go to a Cruise Information

Cruise ID:

#### Go to a Dive Information

Dive ID:

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## MIRAI MR07-01 Bottle Sampling Water Chemical Analysis

Last Modified: 2017-07-28

[ReadMe](#) [Observation Data](#) [Data Format](#) [Quality Information](#)

Cruise ID: [MR07-01](#)

Bottle Sampling Water Chemical Analysis: Processed (PI)

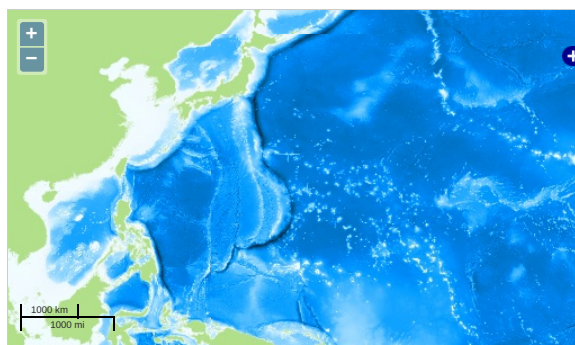
Data Policy: [JAMSTEC](#)

Observation Items: Temperature, Salinity, Dissolved oxygen, Silicate, Nitrate, Nitrite, Phosphate, Ammonia, Total inorganic carbon, Alkalinity, pH

Science Keywords:

OCEANS > OCEAN CHEMISTRY > AMMONIA  
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OCEANS > OCEAN CHEMISTRY > CARBON  
OCEANS > OCEAN TEMPERATURE > POTENTIAL TEMPERATURE

### Observation Map



... Observation Line ... Navigation ... Observation, Dive Point, Hole

Imagery reproduced from ...

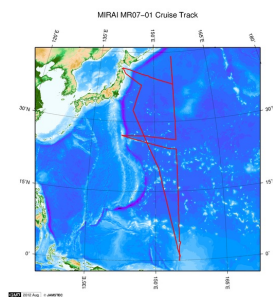
### Data List

☐ File names

☐ MR070100\_ex\_bot.csv

☐ MR070100\_odv\_bot.txt

### Related Information



[Enlarge Image](#)

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Period: 2007-02-16 - 2007-03-26

Chief Scientist: Kazuhiko Matsumoto (JAMSTEC)

Project Name: [Station KNOT]

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SHINSEI MARU  
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SHINKAI 6500  
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6K Sonar DEEP TOW  
KM-ROV  
POWER GRAB SAMPLER  
(SHELL)  
POWER GRAB SAMPLER  
(CLOW)  
BMS

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Dive ID:

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海洋研究開発機構  
JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY